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## A YEAR OF RAILROAD ACCIDENTS.\*

BY H. G. PROUT, EDITOR OF THE "RAILROAD GAZETTE."

EVERY intelligent reader of the newspapers must have thought more than once during the year just ended that it would be a year memorable for the loss of life in railroad accidents. In Europe two of the worst accidents recorded in the whole history of railroading occurred in 1891. On June 14, at Mönchenstein, Switzerland, 73 people were killed and 130, or more, injured by the fall of a bridge under a train. On July 26, at St. Mandé, near Paris, 48 persons were killed and 180 injured in a collision. Up to this time there had never been more than thirteen railroad accidents in which 40 or more persons were killed. In the United States there were no such serious single accidents, but the railroad history of the year has been bloody enough to draw the attention of the most superficial reader.

In the first month of the year there were five collisions of passenger trains in which eight passengers were killed. In February occurred the Fourth Avenue tunnel accident in which six persons were killed and seven injured, and the circumstances of the accident gave it extraordinary prominence. It occurred within the limits of the greatest city of the continent, on the tracks of one of the greatest railroads of America, and fire added to the horror of the occasion. In the same month five persons were killed by a derailment. Then the months followed with no serious accidents until July, in which month 54 passengers were killed on the railroads of the United States. All of these were in four accidents ; 49 of them were killed in three accidents, and 21 in one accident. These figures alone are impressive, but their effect

\*The statistics used in this article have all been gathered by private enterprise, and are necessarily incomplete. The totals of casualties are below the facts, but they are the best that can be had for the whole country. The figures gathered by the Inter-State-Commerce Commission do not go back far enough for comparison, and none have been published by the commission since those for 1889. Moreover, the classification adopted by the commission has been faulty and misleading as to train accidents. The figures here given are sufficiently correct for purposes of a general comparison.

upon the mind is increased by the contrast with the customary course of events. The average number of passengers killed in one month for four years, 1887-1890, was 13.8. To suddenly increase this number to 54 was startling, and it was even more so from the fact that so many passengers had not been killed in any one month since October, 1888, when 70 were killed. In August, 1887, the month in which the Chatsworth accident took place, 80 persons were killed. Aside from these two months, the fatalities in July, 1891, were greater than they had been in any one month for five years. But July was followed by a month of almost equal mortality. In August 42 passengers were killed, 18 of them in a malicious wreck and 14 in a collision, the result of gross negligence on the part of the trainmen. Fortunately, in the next three months there was no great single accident, but in December came the Hastings collision, in which 13 persons were killed or fatally injured. This again excited intense interest, not only because of the number of deaths, but because it was on a very rich railroad with a great volume of business, and because public attention had very lately been drawn towards that railroad by the remarkable efforts that it had been making to increase the speed of passenger trains. The total number of accidents in December cannot now be told, as the statistics are not yet made out, but probably the deaths of passengers in the month will be found to be not less than 20. So the year began and ended with some startling accidents, and contained two months in which the death rate was very unusual. It is of interest to inquire whether or not 1891 has been more fatal in this particular than preceding years.

Before we begin comparisons, we must know what we compare. I shall consider train accidents alone,—that is, accidents which involve more or less injury to a moving train,—and shall confine the examination, so far as possible, to accidents involving passenger trains. Anybody using the figures must remember that the casualties to persons on railroads from train accidents alone are only about 8 or 9 per cent. of the total casualties. Further, of all persons killed on the railroads of the United States, about one-half are trespassers on the tracks and right of way of those railroads. It will be seen, therefore, that the branch of the subject to which this inquiry is limited is unimportant if measured by the relative number of casualties to persons.

I have said that the statistics of December, 1891, are still in-

complete ; therefore, I shall compare the first eleven months of that year with the first eleven months of 1890. In that period there were, in 1890, 1,939 train accidents of all classes, including freight trains. It is impossible to separate the passenger-train accidents without a greater amount of labor than the result would justify. In the corresponding eleven months of 1891 there were 2,215 train accidents. If the December, 1891, average is maintained, the year's accidents will be considerably above those of 1890 ; but 1890 itself was an exceptional year in this respect. For nine years, including 1882 to 1889, the train accidents have averaged 1,452 a year. In 1890 there were 2,146. The greatest number of accidents in any one year before that was 1,935, in 1888. So, considering only the number of train accidents, 1891 has been the worst year in the history of railroading in the United States. In the number of casualties to persons, however, it does not compare unfavorably with 1890. In the first eleven months of 1891 those killed in train accidents were : passengers, 160 ; employees, 488 ; total, including others than passengers and employees, 705. In the first eleven months of 1890 the killed were : passengers, 159 ; employees, 534 ; total, including "others," 753. But 1890 was also a year of unusual fatality. The following little table gives the deaths of and injuries to all persons, including passengers, employees, and others, from train accidents in the nine years 1882 to 1890 inclusive. The figures include freight-train accidents, as do the totals given above.

	Killed.	Injured.		Killed.	Injured.
1890.....	806	2,812	1885.....	307	1,530
1889.....	492	1,772	1884.....	389	1,760
1888.....	667	2,204	1883.....	473	1,910
1887.....	656	1,916	1882.....	380	1,588
1886.....	416	1,409			

It is quite obvious that both 1890 and 1891 were years of extraordinary fatality to those who travel by rail. Necessarily, railroad accidents must increase with the increase of railroad business, but whether or not they have increased relatively faster than the volume of railroad business has increased is hard to say. It is difficult to make an accurate comparison of one year with another, because where the figures are so small as those with which we have to deal, one extraordinary accident affects the total so greatly as to vitiate averages. There is another consideration ; the records of railroad accidents in the United States are very

incomplete. On the other hand, we have means of measuring accurately the progress in the growth of the volume of railroad business. In an attempt to ascertain whether or not railroad accidents have increased in greater ratio than the causes which might lead to such accidents have increased, the increase of miles of railroad operated would not be a fair measure, for as the length of railroad operated increases, the density of traffic on each mile may diminish. The best measure, probably, is that of train-miles. This gives us the total number of miles run by all trains, and this total depends upon the number of trains running, as well as upon the distance run.

It will be seen that the number of accidents ought to increase a good deal faster than the number of trains running. This is so because every additional train on a railroad adds the chance of accident due to its own journey, and also increases the chances of accident to each train which immediately precedes it, to each one which immediately follows it, and to every train that it meets on its journey. If the number of accidents increased in any given time in no greater ratio than the train-miles run, we should be justified in considering that the danger of railroad operation had been very much reduced in that time. If the number of accidents did not increase considerably faster than the train-miles, we should still be justified in assuming that a greater degree of safety had been reached. From the little table given above, it will be seen that 58 per cent. more persons were killed in the three years 1888 to 1890 than in the three years 1882 to 1884. The increase in the train-miles run in the same two periods was 42 per cent. From these figures it is impossible to say whether or not train accidents are *relatively* fewer than they were in 1882 and 1883, but I think that anybody at all familiar with the conditions of railroad operation in the United States will believe they are. It does not follow at all that the railroads of the United States have done all that they can do and ought to do to secure safety in operation. Some estimate as to how far they have done this may be made by taking up some of the more important accidents to passenger trains during the year. We cannot pretend to examine them all, nor would it be profitable to do so. The examination will be limited practically to such accidents as have caused the death of passengers.

In the first six months of the year 25 passengers were killed.

Eight were killed in January in five collisions. One of these was a butting collision on a single-track railroad, the result of a mistake in transmitting or reading orders ; one was a collision in a station yard, the result of carelessness on the part of the yard-men. Another collision was between a freight train crossing over from one track to the other and a passenger train running on the second track. This was an example of a class of accidents which could be provided against with almost absolute certainty by the well-known device of interlocking the switches with the signals which protect those switches. But further than that, such an accident should be provided against, first, by the orders under which the trains were running, and, second, by a proper protection of the train movement by the crew of the freight train. The other two collisions in this month were rear collisions—that is, an engine ran into the rear of the train in each instance. These collisions occurred on crowded tracks in or near the city limits of Chicago, and should have been provided against by block signals.

In February seven passengers were killed. Of these, five were killed in a derailment at Newton, North Carolina. The derailment occurred on a trestle which was wrecked by the shock, and the train fell thirty feet. There seems to be little doubt that the fatal results of this accident were due to the fact that the trestle was weak, or that its floor system was defective. In this month, also, occurred the well-known Fourth Avenue tunnel collision in New York city, in which no passengers were killed, but six employees of the road were killed and seven injured. A train of passenger cars was being hauled to the yards, and the engine of a train following crashed into the rear of these cars, in which the employees were. The result was a bad wreck, which took fire, and it is generally believed that several people lost their lives in the fire. The tunnel is well protected by block signals, but the engineman ran past the signals which were set to danger, for which he was blamed by those who carefully investigated the case. It seems unjust to hold the railroad company responsible for this collision, for the tunnel was protected at least as well as could have been required by the “state of the art” of signalling. The company has, however, been blamed, and justly so, for the use of stoves in the cars. Another remarkable accident occurring in the month of February fortunately caused no deaths, although nine passengers were in-

jured. This was on the Canadian Pacific. An axle broke near a high trestle; the train was derailed, and a sleeping-car fell off the trestle, landing ninety feet below. Of the fifteen passengers in this car nine were more or less injured, but none fatally. An incident which occurred in the same month, although it had nothing to do with an accident, shows the sort of service which railroad men must be prepared for, and is an instance of fidelity which is worth mentioning. During a severe storm a Union Pacific passenger train was blockaded for thirty-six hours. The storm was so furious that the passengers did not dare leave the cars to go even the shortest distance without forming a line. The conductor went back to flag a following fast train and was badly frozen—an almost inevitable result. It is possible, at least, that his courage and devotion to duty prevented an accident.

In March six passengers were killed, four in derailments and two in collisions. One of these derailments, in which two passengers and one trainman were killed, was caused by a broken rail. The wreck took fire from a stove in a baggage car and was entirely consumed. The derailment was one of a class extremely difficult to prevent. A track-walker had gone over the track shortly before the accident, but did not detect the broken rail. The night was dark and rainy, and the rain froze on the track as fast as it fell. One derailment, in which one passenger was killed and ten injured, was caused by a broken wheel; another by a switch being carelessly thrown.

In April no passengers were killed, but there was one disastrous passenger-train accident. At Kipton, Ohio, on the 24th, a butting collision took place between train No. 21, westbound, and train No. 14, a fast mail train, eastbound. This resulted in the death of the two engineers, six postal clerks, and one fireman. Train No. 14 had the right of way, and was running at about fifty miles an hour; No. 21 was going slowly for the purpose of entering a siding to allow No. 14 to pass. The immediate cause of this accident was that No. 21 was behind time and should have stopped at the preceding station, but the conductor decided to run for Kipton, the usual passing-place. He and the engineer were held responsible for the accident, as they should have been, but behind this is the responsibility of the railroad company; for the accident would have been prevented had the road been worked under the absolute block system.

In May two passengers were killed ; the accidents in which they were killed had no special significance. There was, however, one sensational accident in this month. A work train, carrying a gang of men to fight forest fires, was derailed where the rails had been warped by the heat of the fires, and several cars were thrown upon a pile of burning logs. Six men, including the superintendent of the road, were killed or burned to death. A singular and pathetic event in this month was the killing of a child, a passenger in a sleeping-car, by a stone thrown through the window. Unfortunately, the miscreant who threw the stone was never captured.

In June five passengers were killed. Two of these were killed and eleven were injured by a derailment near Coon Rapids, Iowa. The train was derailed on a trestle approaching a bridge over the Coon River by a tie which had been fastened between the rails. The baggage car and four cars following it fell about forty feet. The case was undoubtedly one of malicious wrecking, but the wrecker was never caught. Another accident in this month, in which one passenger was killed and about thirty injured, was to an excursion train the engine of which was running tender first. The tender was derailed by a broken wheel, causing the wreck of the train. This was an example of bad practice in running the tender foremost, which, however, it is sometimes difficult to avoid.

We come now to the disastrous chronicle of July, in which month fifty-four passengers were killed and 120 injured. Twenty-three of these were killed and 27 injured in the accident at Ravenna, Ohio, July 3, at half-past two o'clock in the morning. A passenger train was stopped at a station several minutes beyond the usual time. While standing there, a train of twenty-four loaded refrigerator cars ran into the rear of it. There was a down grade approaching the station where the passenger train stood, and the freight train was not fitted with air-brakes, so that, although the passenger train was partially protected by a man who had gone to the rear with a lantern, the engineman of the freight train did not get the warning in time to prevent the accident. Several persons have been blamed for this accident ; the flagman of the passenger train for not going back far enough, and the engineman of the freight train for running too fast approaching a station when he knew that he was pretty close to the passenger train's time. Doubtless there was fault

of this sort, but back of it all is the fact that under the block system this dreadful accident would have been prevented, and the accident was followed almost at once by measures on the part of the railroad company looking towards equipping the road with block signals. A further lesson is that freight trains should have air-brakes. The next morning, July 4, the two rear cars of a passenger train ran off a trestle bridge eight miles west of Charleston, West Virginia, and fell about twenty feet. The conductor and seventeen passengers were killed, and forty-seven passengers and a mail clerk were seriously hurt. It is said that but one passenger in these two cars escaped uninjured. The cause of this accident has never been precisely determined, but it is said to have been the spreading of the rails from the partial destruction by fire of the cross-ties on the bridge. There seems to have been reasonable inspection of the structure, for it was customary every day for a section-man to walk over the bridge an hour later than the time at which the accident occurred. The other very serious accident in July was a singular one. An excursion train which was being switched at Aspen Junction, Colorado, was struck obliquely by a freight engine approaching on a side track. The car which was hit was little injured, but a check-valve on the side of the locomotive boiler was broken off, and a stream of steam and hot water from the boiler was poured into the car, scalding the passengers so that six were killed on the spot and two died afterwards. In this case the railroad company may properly be blamed, for there are well-known devices by which, in case of such an accident, a check-valve on the inside of the boiler shell is closed, preventing the escape of steam and hot water.

In August forty-two passengers were killed and 186 injured. Thirty-six employees were killed also. On the 27th a passenger train was derailed approaching a bridge near Statesville, North Carolina. The whole train ran off the bridge and fell about eighty feet to the bed of a small stream below, making a terrible wreck. There were 85 passengers in the train, of whom 18 were killed and 15 injured. Four trainmen also were killed, and two badly injured. The water in the creek was dammed by the wreck and some of the victims were drowned. This accident was, almost without question, another malicious wreck. A rail had been either removed or unfastened. The August accident

next in importance was at Montezuma, New York, where 14 passengers and 2 employees were killed. That was a rear collision. Before daylight in the morning an express train ran into the rear of a preceding freight train, which was just entering a side track. There was a dense fog, and the engineman of the passenger train did not see the lantern of the freight trainman who went back to warn him ; in fact, the lantern was only carried back a very short distance. Fourteen passengers were killed and sixteen injured. The flagman did not do his duty by going back as far as he should have done even had the night been clear ; as it was foggy, his duty in the case was still more apparent. But beyond all this is the fact that the accident would have been prevented had the road been operated under the block system. In this case the defect is still more noticeable because a portion of the same road has been worked under block signals for years. On the 5th of this month a butting collision took place at Champlain, New York, between a regular passenger train and an excursion train, in which three passengers were killed and 10 or 11 injured. The railroad company was blamed by the coroner's jury for employing trainmen who were not familiar with the road. On the 31st, near Tell City, Indiana, a train was derailed by a broken wheel on the front truck of the locomotive. Four passengers were killed and 20 injured.

In September six passengers were killed and ninety-five injured. One was killed in California by a freight train running into the rear of a passenger train which had been stopped on a steep grade by a land-slide. The rear of the train was not properly protected by the train crew. Near Pickerell, Nebraska, one passenger was killed and one injured by a butting collision due to the failure of an operator to deliver orders. At Kent, Ohio, one passenger was killed and 24 injured in a butting collision which was caused by neglect on the part of the crew of a freight train to observe the signals carried by the preceding passenger train ; that is, a passenger train was being run in six sections, carrying a large number of excursionists. When the fifth section passed the siding on which the freight train stood, the trainmen of the latter assumed that it was the sixth, and pulled out on the track. None of the other accidents of this month was remarkable except one in which a train of ten cars, carrying 700

passengers, was derailed and several of the cars were overturned into a stream. By remarkable good luck, however, no one was killed, although 18 passengers were injured.

In October thirteen passengers were killed and seventy-four injured. Only three were killed in the cars of a passenger train, and two of these were killed in a derailment which has never been explained. Six passengers in a caboose at the rear of a freight train were killed at Thorson, Minnesota, the result of gross negligence on the part of the trainmen of a freight train following an extra which was running very fast, contrary to orders. On the 15th, near Crete, Illinois, a passenger train ran through a misplaced switch and into a round-house, a portion of which fell and crushed the cab of the locomotive. The engineer and three newspaper reporters, who were riding on the engine, were killed. These men had gone out on the engine of a fast train to write up a run. This accident was followed, a few days later, by another one of a very similar character near Monmouth, Illinois. In this latter case a passenger train again ran through an open switch and several of the cars were overturned and badly wrecked. Two passengers, the engineman, and a travelling engineer were killed; the fireman and 19 passengers were injured. In both of these cases it has been claimed that the switches had been tampered with, but, whether or not this is true, the railroad companies are not relieved of the responsibility for the accidents, because there is a very well-known and widely-used method of preventing just such accidents—that is, by the protection of switches by distant signals. Signals are placed at such distances as to give ample warning of the condition of the switch, and these are so connected to the switch that it cannot be thrown without first throwing the signal. Another accident occurring in this month resulted in the death of no passengers, but a brakeman and an express messenger were killed, and three postal clerks and a baggeman injured. This was a butting collision between an express train and a freight train, and was the result of an extraordinary combination of circumstances. The point was properly protected by block signals, but the operator on one side had fallen asleep and left a clear signal for the westbound train. The signals were set against the eastbound train, but the engineman failed to observe them. There was a dense fog at the time.

In November seventeen passengers were killed and sixty-four

were injured. The worst accident of the month was at Toledo, Ohio, where, early in the evening of the 28th, nine passengers were killed and about twenty injured. The situation was a complicated one. One passenger train had stopped about one hundred and eighty feet east of a short tunnel. A passenger train following ran into the rear of this standing train. The accident happened within the "yard limits," where orders require all engineers to keep such speed that they can stop within the range of vision. The tunnel was somewhat obscured by smoke, and the engineman of the second train was blamed, and justly, for running too fast and not keeping a sharp enough lookout. He should have been able to stop in one hundred and eighty feet if he had been running at twenty miles an hour or less, and it is clear that his speed was too high, or that he did not apply the brakes as soon as he ought, or both. But behind all this is the old fault, insufficient signalling. At Perry, New York, a car was derailed and went down a bank into a stream and one passenger was drowned,—cause, broken rail. Near Medina, Tennessee, one passenger was killed in a butting collision between a passenger train and a freight,—cause, mistake of orders or disobedience. The other passengers killed this month were on freight trains.

December opened with a rear collision of an express train with a local passenger train standing at Tarrytown station, New York, in which no one was killed, as the passengers had been warned and had left the standing train,—cause, defective signalling. On December 3 an express train ran into the rear of a gravel train near Pennington, New Jersey, killing four employees and injuring 15 passengers ; and on the 4th, at East Thompson, Connecticut, two freight trains were wrecked by a collision, a passenger train ran into the wreck, and a second passenger train ran into the rear of the first. One passenger is supposed to have been burned in the wreck, but, wonderfully enough, there were no other deaths. This complicated accident and the one at Pennington would have been avoided by proper signalling. In the East Thompson accident the wreck of the freight trains would have been prevented by block signals, but after that took place the wreck of the first passenger train could not be prevented. The freight wreck fouled the passenger track, and there was not time to send out a flag before the first passenger train arrived. The flagman of this train was thrown to the ground and stunned, and before this was known

the fourth train was in the wreck. Finally, the year of railroad accidents came to a dramatic end on Christmas eve with the dreadful disaster at Hastings, New York. One express train, which had come to an unexpected stop, was run into from the rear by another express going at about forty miles an hour. Thirteen people were killed outright or have since died. The immediate cause was the failure of the flagman to do his duty. The ultimate cause was one that has been generally recognized—the lack of proper signals.

I have cited only thirty-six accidents out of several hundred. The number of passenger trains involved in accidents during the year was not far from 850 or 900, but the number of accidents was, of course, somewhat less, as there were a good many collisions involving two passenger trains each. But those thirty-six accidents are characteristic. The first great fact that appears is that twenty-two of them might have been prevented had employees obeyed orders. They were not called on to exercise wit or judgment in alarming emergencies, but simply to obey orders. Space and time are lacking to discuss the measures that operating officers take to maintain discipline and the difficulties that they encounter. It is enough to say that this is the most troublesome part of their duties, and that the unions, instead of helping, have made matters worse. We may hope that this is a passing phase of trade-unionism, and that, as the men learn more of their proper relations to the rest of the world, they will discover that it is for their own interest to weed out the insubordinate, the inefficient, and the drunken.

The next striking fact is that nineteen of these accidents would probably have been saved by block signals and interlocked switches and signals. I would not say unqualifiedly that every one of the roads on which these accidents happened should at once equip its tracks with block signals and interlock all of its switches. There are reasonable limits within which they must work ; but it may be said without qualification that it is poor railroad economy to operate a road having a heavy and fast traffic without block signals and interlocking for the protection of switches. It can be proved by the statistics of cost of accidents that a judiciously-planned block system pays in money, and generally on a crowded road it actually facilitates the movement of trains. In fact, there is a good deal of nonsense talked and

written about the cost of establishing, maintaining, and operating block signals. Some of these accidents could have been prevented, and more would have been mitigated, had freight trains been fitted with air-brakes.

It is some comfort to see that so few of these fatal accidents were due to defects of track and equipment ; and it will, no doubt, surprise many people to know that one-twelfth of the whole number were malicious. It is humiliating, but should be encouraging, that only about half a dozen of these thirty-six accidents were without fault on the part of the railroad officers or employees. This is encouraging, because it shows that many of the fatal accidents of the year would not have happened under conditions of operation which we may expect will be realized before many years have passed.

H. G. PROUT.